AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Complete Listing of Claims:

1. (currently amended) A copper foil for lamination to a dielectric substrate, the copper foil comprising:

a peel strength enhancement coating deposited on a surface of the copper foil to be laminated to said dielectric substrate, the peel strength enhancement coating consisting essentially of a metal and metal oxide mixture, the metal and metal oxide mixture being formed from one or more of: vanadium, niobium, tantalum, chromium, molybdenum, tungsten, manganese, technetium, and rhenium, wherein an amount of oxygen in said metal oxide is maximized.

2. (original) The copper foil of claim 1, wherein the surface of the copper foil is smooth.

3. (currently amended) The copper foil of claim 1, wherein the metal oxide is selected from the group consisting of chromate, tungstate and molybdate ~~elements of chromium, tungsten, and molybdenum~~.

4. (original) The copper foil of claim 1, wherein the peel strength enhancement coating has a thickness of between about 20 to about 200 angstroms.

5. (original) The copper foil of claim 1, wherein silane is deposited on the peel strength enhancement coating prior to lamination to the dielectric substrate.

6. (currently amended) An article comprising:

a dielectric substrate;

a copper foil having a ~~smooth~~ surface laminated to the dielectric substrate; and

a peel strength enhancement coating disposed between the copper foil and the dielectric substrate, said peel strength enhancement coating being a mixture of a metal and

a metal oxide with said metal selected from the group consisting of one or more of vanadium, niobium, tantalum, chromium, molybdenum, tungsten, manganese, technetium, and rhenium and an amount of oxygen in said metal oxide is maximized, wherein the copper foil exhibits less than or equal to 10% loss of peel strength when measured in accordance with IPC-TM-650 Method 2.4.8.5 using a 1/8 inch test specimen after being immersed in 4N HCl at 60°C for 6 hours.

7. (currently amended) The article of claim 6, wherein the ~~peel strength enhancement coating consists essentially of a metal and metal oxide mixture formed from one or more of: vanadium, niobium, tantalum, chromium, molybdenum, tungsten, manganese, technetium, and rhenium~~ copper foil surface laminated to the dielectric substrate is smooth.

8. (currently amended) The article of claim 7, wherein the metal oxide is selected from the group consisting of chromate, tungstate and molybdate ~~elements of chromiumm, tungsten, and molybdenom~~.

9. (original) The article of claim 6, wherein the peel strength enhancement coating has a thickness of between about 20 to about 200 angstroms.

10. (original) The article of claim 6, wherein the peel strength enhancement coating exhibits less than or equal to 10% edge undercut after the immersion in 4N HCl at 60°C for 6 hours.

11. (original) The article of claim 6, wherein the copper foil exhibits less than or equal to about 7% loss of peel strength when measured in accordance with IPC-TM-650 Method 2.4.8.5 using a 1/8 inch test specimen after being immersed in 4N HCl at 60°C for 6 hours.

12. (original) The article of claim 6, wherein silane is deposited on the peel strength enhancement coating prior to lamination to the dielectric substrate.

13. (withdrawn) A method for increasing the peel strength of a copper foil laminated to a dielectric substrate, the method comprising:

prior to lamination, immersing the copper foil in an aqueous electrolytic solution containing oxyanions formed from one or more of: vanadium, niobium, tantalum, chromium, molybdenum, tungsten, manganese, technetium, and rhenium..

14. (withdrawn) The method of claim 13, wherein the metal is selected from one of chromium, molybdenum, and tungsten.

15. (withdrawn) The method of claim 13, wherein the aqueous electrolytic solution contains chromate, tungstate, or molybdate ions in deionized water.

16. (withdrawn) The method of claim 13 wherein the aqueous solution is an electrolyte solution in an electrolytic cell, and the method further comprises:

passing current through the copper foil and the electrolyte solution such that a coating having a thickness of between about 20 to about 200 angstroms is deposited on the copper foil.

17. (withdrawn) The method of claim 16, further comprising:

immersing the copper foil in silane after depositing the coating on the copper foil.

18. (withdrawn) A copper foil for lamination to a dielectric substrate, the copper foil comprising:

a layer deposited on a surface of the copper foil, the layer being formed from chromium and zinc ions or oxides and treated with an aqueous solution containing at least 0.5% silane.

19. (withdrawn) The copper foil of claim 18, wherein the surface of the copper foil is smooth.

20. (withdrawn) The copper foil of claim 18, wherein the thickness of the layer is from about 10 angstroms to about 100 angstroms.

21. (withdrawn) A method for increasing the peel strength of a copper foil laminated to a dielectric substrate, the method comprising:

prior to lamination, co-depositing a mixture of chromium and zinc ions or oxides on surfaces of the copper foil;

subsequent to the co-deposition step, immersing the copper foil for at least one second in an aqueous solution containing at least 0.5% silane in deionized water; and

drying the copper foil prior to lamination.

22. (withdrawn) The method of claim 21, wherein the aqueous solution consists essentially of 0.5% silane in deionized water.

23. (withdrawn) The method of claim 21, wherein the aqueous solution is at a temperature of between about 15°C to about 30°C.

24. (withdrawn) The method of claim 21, wherein the co-depositing a mixture of chromium and zinc ions or oxides includes:

providing an electrolytic cell containing an anode disposed in an electrolyte solution containing chromium and zinc ions;

providing the copper foil as a cathode; and

electrolytically depositing the chromium and zinc ions on the copper foil.

25. (withdrawn) The method of claim 24, wherein the electrolyte solution is a basic solution containing hydroxide ions from about 0.07 g/l to about 7 g/l zinc ions, and from about 0.1 g/l to about 100 g/l of a water soluble hexavalent chromium salt wherein the concentration of either the zinc ions or the chromium (VI) ions or both is less than 1.0, and the co-deposition step includes:

immersing the copper foil in the electrolyte solution; and

passing current through the copper foil and the electrolyte solution such that a current density of from about 1 milliamp per square centimeter to about 1 amp per square centimeter is provided.

26. (withdrawn) The method of claim 25, wherein the electrolyte solution consists essentially of from about 10 to about 35 g/l NaOH, from about 0.2 to about 1.5 g/l ZnO, and from about 0.2 to about 2 g/l $Na_2Cr_2O_7.2H_2O$.

27. (withdrawn) The method of claim 21, wherein the thickness of a layer formed from the chromium and zinc ions or oxides deposited on the copper foil is from about 10 angstroms to about 100 angstroms.

28. (withdrawn) The method of claim 21, further comprising:
rinsing the copper foil after the immersing and before the drying.